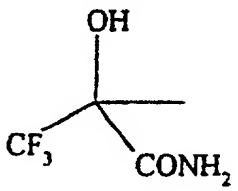
Patent Claims

1. Microorganisms, characterized in that they are capable of utilizing the propionamide of the formula



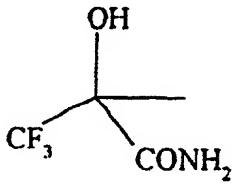
VI

in the form of the racemate or of its optically active isomers as the sole nitrogen source, and enzyme extracts therefrom.

2. Microorganisms according to Claim 1 of the genus Rhodococcus, Arthrobacter, Bacillus, Klebsiella or Pseudomonas.

3. Microorganisms according to Claim 2 of the species Klebsiella oxytoca PRS1 (DSM 11009), Klebsiella oxytoca PRS1K17 (DSM 11623), Rhodococcus opacus ID-622 (DSM 11344), Arthrobacter ramosus ID-620 (DSM 11350), Bacillus sp. ID-621 (DSM 11351), Klebsiella planticula ID-624 (DSM 11354), Klebsiella pneumoniae ID-625 (DSM 11355) or of the species Pseudomonas sp. (DSM 11010) or their functionally equivalent variants and mutants.

4. Polypeptide having amidohydrolase activity and capable of hydrolysing (R)-3,3,3-trifluoro-2-hydroxy-2-methylpropionamide of the formula



VI.

5. Polypeptide according to Claim 4, in which the polypeptide embraces the amino acid sequence shown in SEQ ID No. 2 or a fragment thereof or a functionally equivalent derivative of this sequence or of this sequence fragment with deletions, substitutions, insertions, inversions, additions and/or exchanges of amino acids.

6. DNA sequence encoding a polypeptide according to any of Claims 4 or 5.

7. DNA sequence for the expression of a polypeptide according to either of Claims 4 and 5 in a host, comprising a DNA sequence selected from amongst
(a) DNA with the sequence shown in SEQ ID No. 1, fragments thereof and sequences which are complementary thereto, and also sequences derived from them which are degenerated in the encoding regions due to the variation of the genetic code; and
(b) DNA sequences which hybridize with the encoding regions of the sequences defined under (a), or fragments thereof.

8. DNA sequence according to Claim 6 or 7, characterized by the restriction map as shown in Fig. 1 or functionally equivalent variants and mutants thereof.

9. Recombinant DNA molecule or vector, containing a DNA sequence according to any one of Claims 6 to 8.

10. Recombinant DNA molecule according to Claim 9, viz. plasmid pPRS1b, pPRS7, pPRS4 or plasmid pPRS2a.

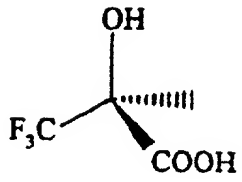
11. Microorganisms containing a recombinant DNA molecule or a vector according to either of Claims 9 and 10.

12. Microorganisms according to Claim 11, selected from amongst microorganisms of the genus Escherichia, Pseudomonas, Comamonas, Acinetobacter, Rhizobium/ Agrobacterium, Rhizobium, Bacillus, Rhodococcus or Agrobacterium.

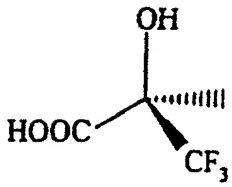
13. Microorganism Escherichia coli DH5, containing plasmid pPRS1b, pPRS2a, pPRS4 or plasmid pPRS7.

14. Microorganism Escherichia coli XL1-Blue MRF'®, containing plasmid pPRS1b, pPRS2a, pPRS4 or plasmid pPRS7.

15. Process for the preparation of (S)- or (R)-3,3,3-trifluoro-2-hydroxy-2-methylpropionic acid of the formulae

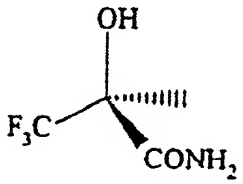


I

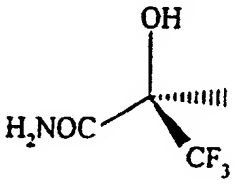


II

and/or of (R)- or (S)-3,3,3-trifluoro-2-hydroxy-2-methylpropionamide of the formulae

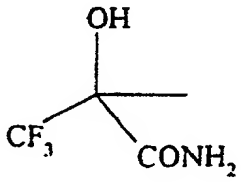


VII



VIII

comprising the conversion of the propionamide of the formula



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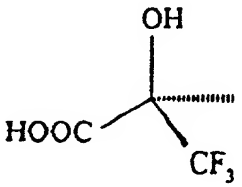
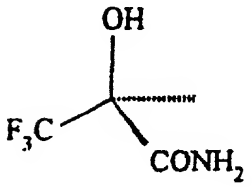
into the compounds of the formulae I, II, VII or VIII by means of a microorganism according to Claims 1 to 3 or 11 to 13, enzyme extracts therefrom or by means of a polypeptide according to Claims 4 or 5, and, if appropriate, isolation of these compounds.

16. Process for the preparation of (R)-3,3,3-trifluoro-2-hydroxy-2-methylpropionic acid of the formula



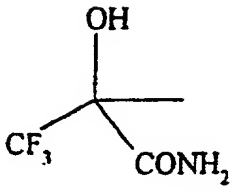
II

and/or of (S)-3,3,3-trifluoro-2-hydroxy-2-methyl-propionamide of the formula



VII

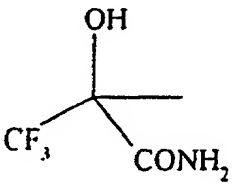
comprising the conversion of the propionamide of the formula



VI

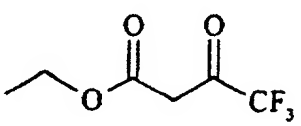
into the compound of the formula II by means of a microorganism according to Claim 2 of the genus Klebsiella, by means of a microorganism according to Claims 11 to 14 or a polypeptide according to Claims 4 and 5, and, if appropriate, isolation of this compound and/or of the compound of the formula VII formed during this conversion.

17. Process according to Claim 15 or 16, characterized in that the propionamide of the formula



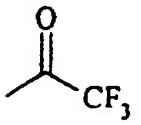
VI

is prepared by converting, in a first step, trifluoroacetate of the formula



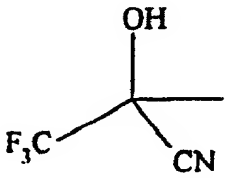
III

into trifluoroacetone of the formula



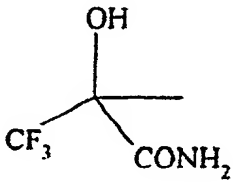
IV

using a mineral acid, converting the former, in the second step, into the propionitrile of the formula



V

using a cyanide, and converting the former, in the third step, into the propionamide of the formula



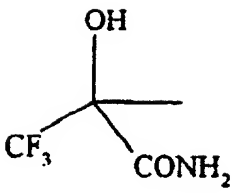
VI

either chemically using a concentrated mineral acid or microbiologically using mutated microorganisms of the genus Rhodococcus.

18. Process according to Claim 17, characterized in that the mineral acid used in the first and third step is sulphuric acid, phosphoric acid or nitric acid.

19. Process according to Claim 17 or 18, characterized in that the cyanide used in the second step is an alkali metal cyanide.

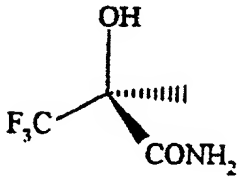
20. Process according to one of Claims 15 to 19, characterized in that the conversion of the propionamide of the formula



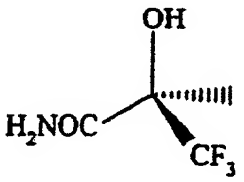
VI

is carried out using microorganisms of the genus Klebsiella, Rhodococcus, Arthrobacter, Bacillus, Escherichia, Comamonas, Acinetobacter, Rhizobium, Agrobacterium, Rhizobium/Agrobacterium or Pseudomonas.

21. Process according to any of Claims 15 to 20, characterized in that the (S)- or (R)-3,3,3-trifluoro-2-hydroxy-2-methylpropionamide of the formulae



VII



VIII

is hydrolysed to the compound of the formula I or II, either chemically in the presence of a base or microbiologically using microorganisms of the genus Rhodococcus.

22. (R)-3,3,3-Trifluoro-2-hydroxy-2-methyl-propionamide.

23. (S)-3,3,3-Trifluoro-2-hydroxy-2-methyl-propionamide.